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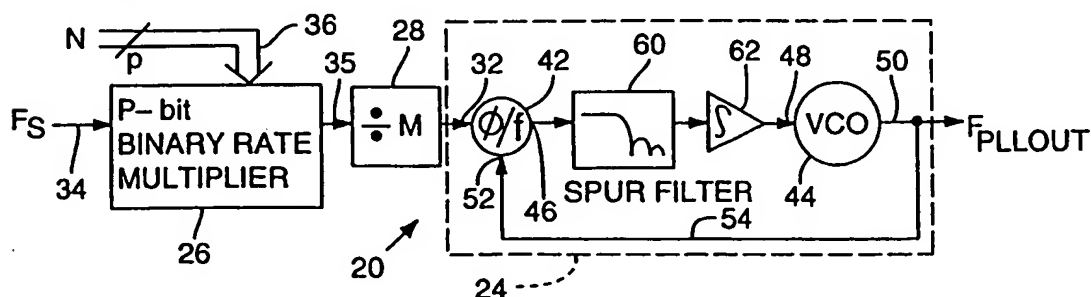11506-21st Place NE
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(54) Phased locked loop synthesizer using a digital rate multiplier reference circuit.

(57) A phase locked loop synthesizer (20) for generating a digitally programmable, continuous wave signal comprises a rate multiplier (26) and divider (28) connected in a reference signal path to a phase detector (42). The rate multiplier and divider generate a reference signal which is programmable to any of a set of regularly spaced frequencies having exact decimal representations. The divider limits the peak-to-peak phase deviation of the rate multiplier. The phase detector locks a synthesized signal generated by a variable frequency oscillator (44) to the phase of the programmed reference signal. A spur filter (60) connected to the phase detector output (46) reduces spurious frequencies in the phase detector output.

FIG. 1

EP 0 665 651 A3

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US-A-4 965 533 (GILMORE) 23 October 1990 * column 2, line 30 - line 48 * * column 5, line 14 - column 8, line 54; figure 2 *	1,2	H03L7/197 H03L7/183
A	---	5,6,8	
X,P	EP-A-0 630 129 (ALCATEL SEL AG) 21 December 1994 * page 6, line 37 - line 52; figure 8 *	1,2	
Y	--- US-A-3 651 422 (M. J. UNDERHILL) 21 March 1972 * column 1, line 73 - column 4, line 23; figures *	1,2	
A	---	5,8	
Y	RADIO AND ELECTRONIC ENGINEER, vol. 48, no. 3, March 1978 LONDON GB, pages 127-132, L. K. REGENBOGEN 'A LOOSE-LOCKED OSCILLATOR' * the whole document *	1,2	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	---	5-7	H03L
Y	PATENT ABSTRACTS OF JAPAN vol. 9 no. 99 (E-311) ,27 April 1985 & JP-A-59 225619 (NIPPON DENKI KK) 18 December 1984, * abstract *	5,8	
A	---	1,2	
Y	OBERMAN R. M. M. 'Electronic counters' 1973 , MAC MILLAN , LONDON, GB * page 198 - page 208; figures 9.8-9.12 * ---	5,8	

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 September 1995	Balbinot, H

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US-A-3 297 953 (EVAN T. COLTON) 10 January 1967 * column 2, line 27 - column 6, line 63; figures *	1,2,5,8	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

The present search report has been drawn up for all claims

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THE HAGUE	13 September 1995	Balbinot, H

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